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# VICTORIA

# FALLS



## AN ALBUM

By the  
Rev. ALBAN HEATH  
and  
PERCY M. CLARK,  
F.R.G.S.



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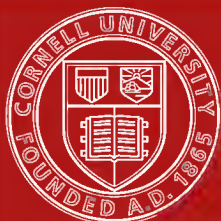
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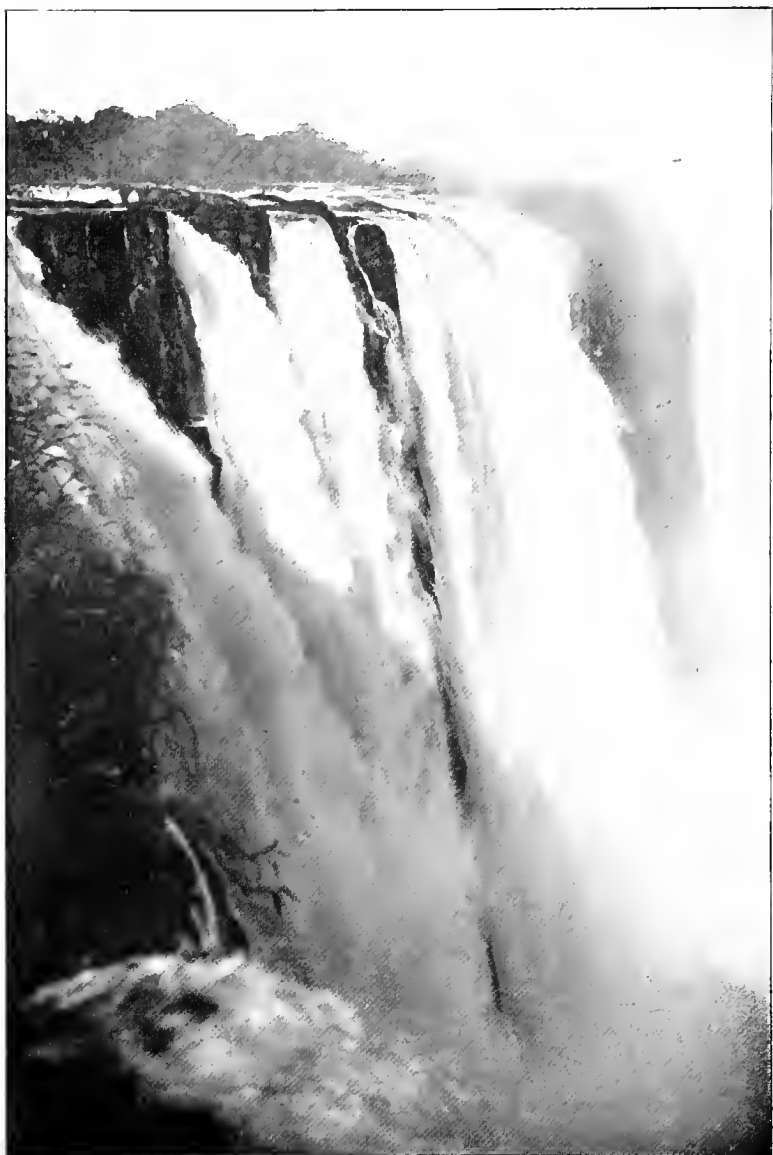












THE VICTORIA FALLS. FROM CATARACT ISLAND.



# VICTORIA FALLS : :

AN ALBUM



BY THE  
REV. ALBAN HEATH,  
AND  
PERCY M. CLARK,  
F.R.G.S.



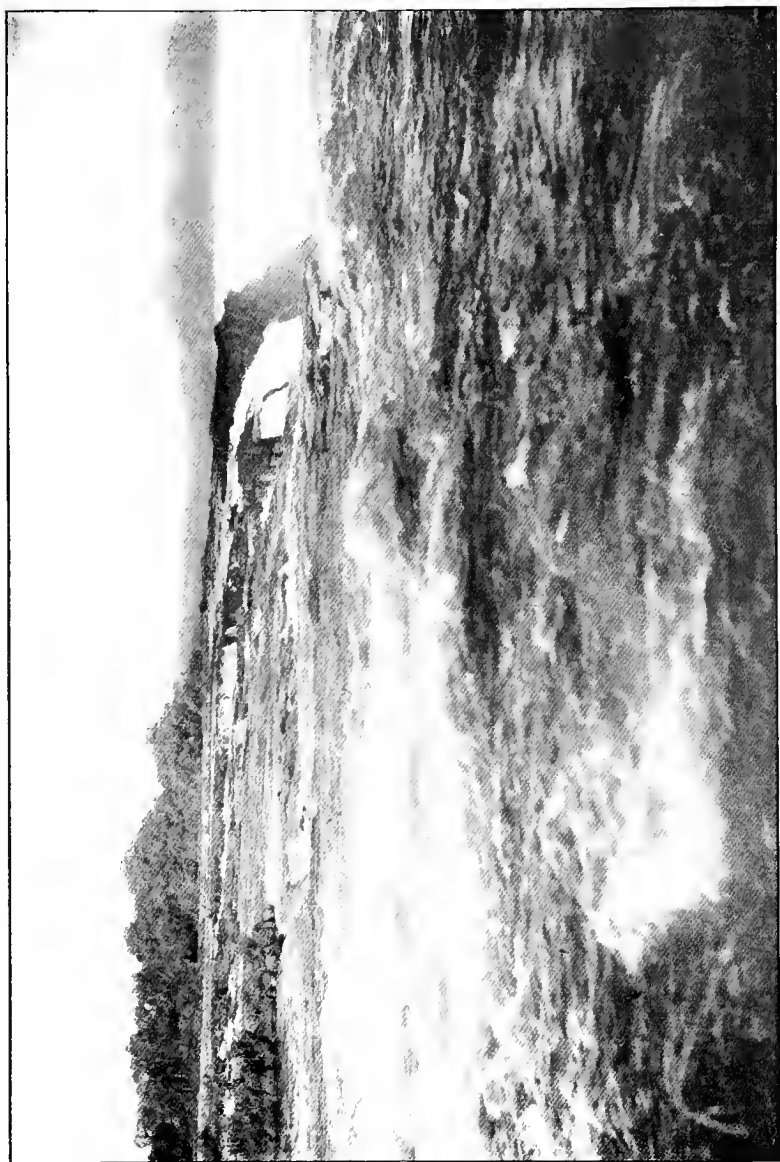






THE RIVER ZAMBESI.





"INTO THE UNKNOWN DEEP"



# VICTORIA FALLS ::

## THE RIVER

On and on, for ever on,  
For a myriad years and more,  
Laving the lips of a thousand isles  
In its march on to the shore.

Flowing for ages ever on,  
Bathing in centuries deep,  
Out of the heart of the unknown land,  
Into the unknown deep.

Rippling and dancing on upland plain,  
Cooing an elfish song,  
Gambolling and tossing in wild refrain  
Like seas as it rolls along.

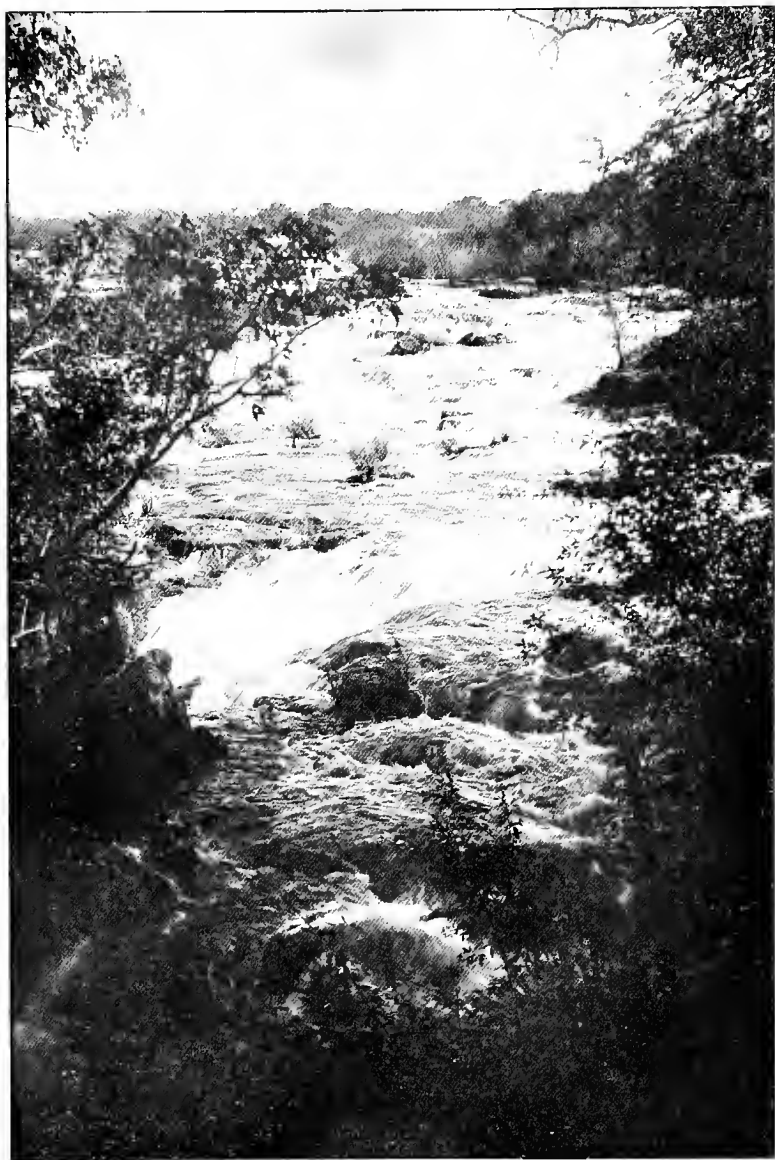
Thundering along through forest wild,  
Gliding o'er grassy lea,  
Leaping the cataract, ploughing the gorge,  
On to the mighty sea.

On and on, for ever on,  
For a myriad years and more,  
Laving the lips of a thousand isles  
In its march on to the shore.

## ABOVE THE FALLS

The waters are gathered calm and still  
Like a little child asleep,  
Under the frown of Livingstone hill,  
Above the cavernous deep.





"GAMBOLLING AND TOSSING IN WILD REFRAIN."





"LAYING THE LIPS OF A THOUSAND ISLES."



## THE FALLS

The waters peep  
Into the deep,  
Coy as a maid,  
Looking afraid,  
Dumb as an easel,  
Quick as an eagle  
To see the trap  
In Nature's lap  
That waits like a cat  
For the mischievous rat  
That hovers around.  
Below, in the abyss,  
The waters hiss,  
And growl and scowl,  
And snarl and howl,  
And moan and groan,  
And heave and sigh,  
And surge and cry  
For the waiting stream,  
Still all agleam,  
With its mirrored sheen,  
'Neath the sun's bright beam,  
Coy as a maid,  
And half afraid  
To take the leap  
O'er cliffs so steep,  
Into the stygian deep.

On the eastern side,  
Where the waters bide,  
Purling and curling,  
Eddying and twirling,  
There's many a call,  
To try the fall,  
From the waters below  
To the waters above,  
And rainbows flicker in the sun,  
Telling of all the rollicking fun  
After the leap  
Into the deep.  
And the quivering stream,  
Still all agleam,  
Coy as a maid,  
And half afraid,  
Feels the pull of the waters down below  
And sees the glory bow on bow.





THE WATERS ARE GATHERED CALM AND STILL.



VIEW OF RIVER FROM THE WESTERN END





THE RAINBOW FALL.



Then, as temptation spreads its toils  
And gathers its victim in its coils,  
And spreads o'er life a glow that lures,  
Creating a thirst that aye endures,  
The Rainbow Fall  
With plaintive call  
And tinselled bows  
Set out in rows,  
Pulls at the stream  
Still all agleam,  
With mirrored sheen  
'Neath the sun's bright beam,  
Till the purling river,  
With pulse a-quiver,  
Takes the leap  
Into the deep.  
Down go the cascades in featherly flight  
Like ostrich plumes, curly and white,  
And as an avalanche,  
Glacier on glacier,  
Hurls through the passes  
Terrific masses,  
Plunges the Main Fall  
Into the chasm,  
Flinging the spray up to the skies,  
Flashing the rainbow back to the eyes,  
As with giant stride it leaps  
Over the precipice into the deep,  
Four hundred feet and more.

## THE DEVIL'S CATARACT

The Devil's Cataract  
Follows the rash act,  
Helter-skelter,  
All awelter,  
Head over heels ;  
It totters, it reels,  
It giggles, it wriggles,  
It struggles, it shuffles.  
Blundering, thundering,  
Hammering, clamouring,  
Dashing and clashing,  
Splashing and smashing,  
In terrific masses,  
The water passes  
Into the misty, vasty chasm.





THE MAIN FALL.





SPRING AND CREEK



## THE CHASM

At night, when moonbeams play around,  
 And lunar rainbows leap to the ground,  
 The chasm is full of eerie sound,  
 The voices of those who were never found,  
 The plaintive voices of men who were drowned ;  
 Graves unmarked by friendly mound !

## THE RAIN FOREST

All the weird host of the phantom world  
 Dance in the forest with tails uncurled,—  
 The fairies, the trolls, and all the wild pixies,  
 The crions, the goblins, the knaves and the nixies,  
 Water-sprites, courils, the kobolds and gnomes,  
 The still-folk, the bogles, the elves and brownies—  
 Dance to the music with elfish delight,  
 Dance and enjoy the fearsome sight,  
 While men of strong nerve walk, stealthy, along  
 O'erwhelmed by the thunderous notes of the song.

\*   \*   \*   \*   \*

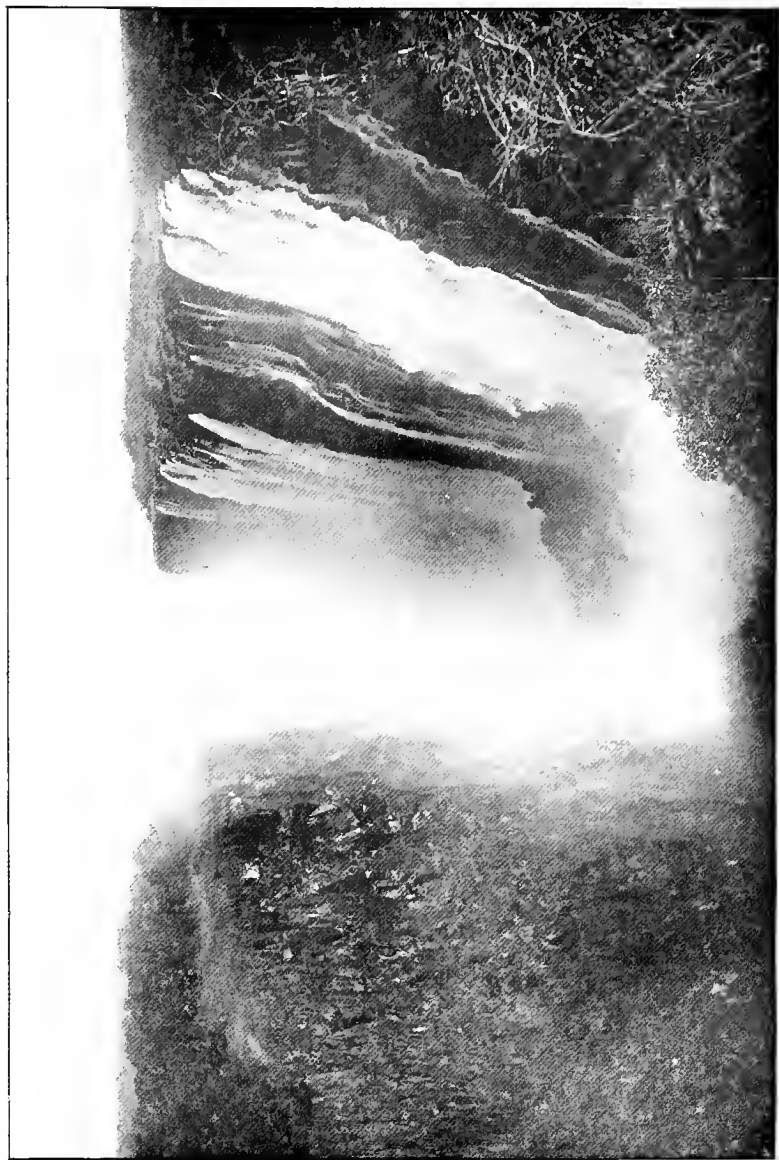
Who shall Zambesia's mysteries tell ?  
 Who its history unfold ?  
 Who tell the stories of what befell  
 In the far-off days of old ?  
 On and on, for ever on  
 For a myriad years and more,  
 Laving the lips of a thousand isles  
 In its march on to the shore.





THE DEVIL'S CATARACT.





THE CHASM.









"FLINGING THE SPRAY UP TO THE SKIES."



## NATURE'S PICTURE GALLERY

VICTORIA FALLS rank as one of the great spectacular wonders in Nature's picture gallery. Their claim to a prominent position among the world's most beautiful scenes might call for a discussion on the constituent elements of a truly great natural picture. But we have no intention of entering into such a discussion here. Artistic values cannot be set forth with mathematical precision and clearness. The attempts that are made from time to time to tabulate and classify the most magnificent scenes in the gallery of Nature are only partially successful. During the year 1912 *The Westminster Gazette* opened its columns to a discussion on the subject, but no absolute certainty resulted. We do not think it is possible to say definitely and finally what are Nature's greatest marvels, for there are varying factors, subjective and objective, which cannot be disregarded or eliminated, that modify any conclusion arrived at.

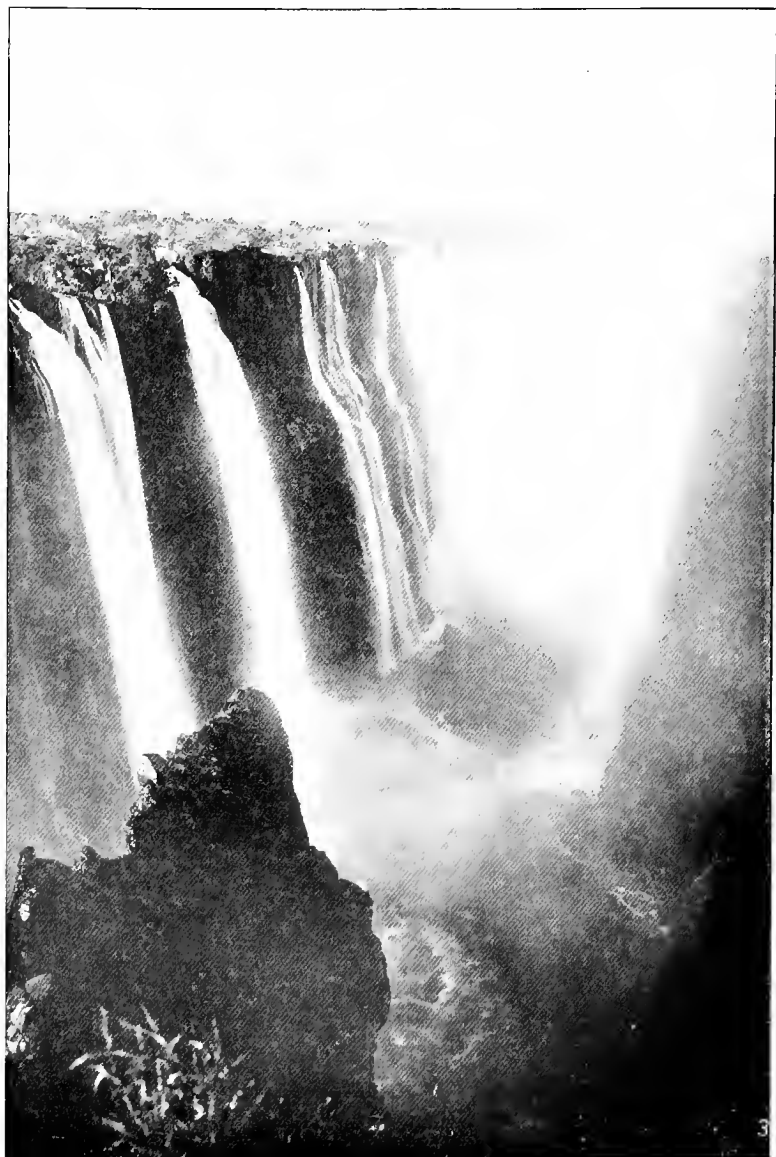
Our classification depends largely upon the impressions that happen to be made on ourselves, but a great marvel of Nature may not leave a uniform impression upon a group of visitors. "The eye sees only that which it brings power to see," as Seneca pointed out so long ago. Not all who visit the world's beauty-spots see the essential beauty. Mrs. Browning sings in *Aurora Leigh* :—

"Earth's crammed with heaven,  
And every common bush afire with God ;  
But only he who sees takes off his shoes ;  
*The rest sit round it and pluck blackberries.*"

But that is only another way of saying the impressions made by a thing of beauty vary in quality and degree, according to the temperament of the onlooker.

Imagination, which is so essential to a just appraisal of artistic values, is a very variable thing. The power to read the beautiful in Art or Nature is not given to all. Where one drinks in the sublime by a natural and involuntary act of the mind, or reads the message and meaning of lines and curves, another sees only a splash of colour, or discovers a tangled skein. There is





FROM DANGER POINT.







no fixed standard of judgment, no final court of appeal, unless we accept as final the arbitrament of the artistic soul.

But on one thing all are agreed. The power to make and leave a deep and lasting impression on the mind, to move the soul to rapture, to thrill the heart with a thousand rollicking sensations, or to smite it with an awesome sense of the sublime, constitutes in any scene or thing a claim to the distinction of being "great." Judged by this standard, Victoria Falls must be given a high place in the list of Nature's marvels.

We must be devoid of both intelligence and imagination to escape such a result when looking upon Victoria Falls. This teeming mass of waters gambolling in the tropical sun have an unmeasured power to impress the mind. If we view them from different points of vantage, moving from East to West, we note the movement as of a vast crescendo. The trickling waters at the eastern end merge into the feathery splendours of the Rainbow Falls. The Rainbow Falls lose themselves in the mightier waters of the Main Falls. The Main Falls swell into the awesome grandeur of the Devil's Cataract at the western extremity. A popular living philosopher advises his readers to try the experiment of listening to the best music with closed eyes. If we act on this advice, with the Rain Forest as our chosen seat, we seem to hear a "Devil's Chorus" with a dominant melody of a finer kind. Every note of the gamut is there. It is as "the voice of many waters," now dying down with a musical cadence, and again swelling into a superb fortissimo; now running along like a graceful cadenza, and again leaping into a melodious chorus. It is as though some great god had run his hand over a tremendous harp from the thin, shrill chords of the treble to the fat, sonorous strings of the bass. As we look upon this marvellous scene and listen to its unearthly music, we are thrilled with awesome wonder, overcome with the sense of our own impotence. With Wordsworth we seem to hear—

"The still, sad music of humanity,  
Not harsh, nor grating, though of ample power  
To chasten and subdue."

And again, like him, we feel—

"A presence that disturbs us with the joy  
Of elevated thoughts; a sense sublime  
Of something far more deeply interfused,  
Whose dwelling is the light of setting suns,  
And the round ocean and the living air,  
And the blue sky, and in the mind of man."

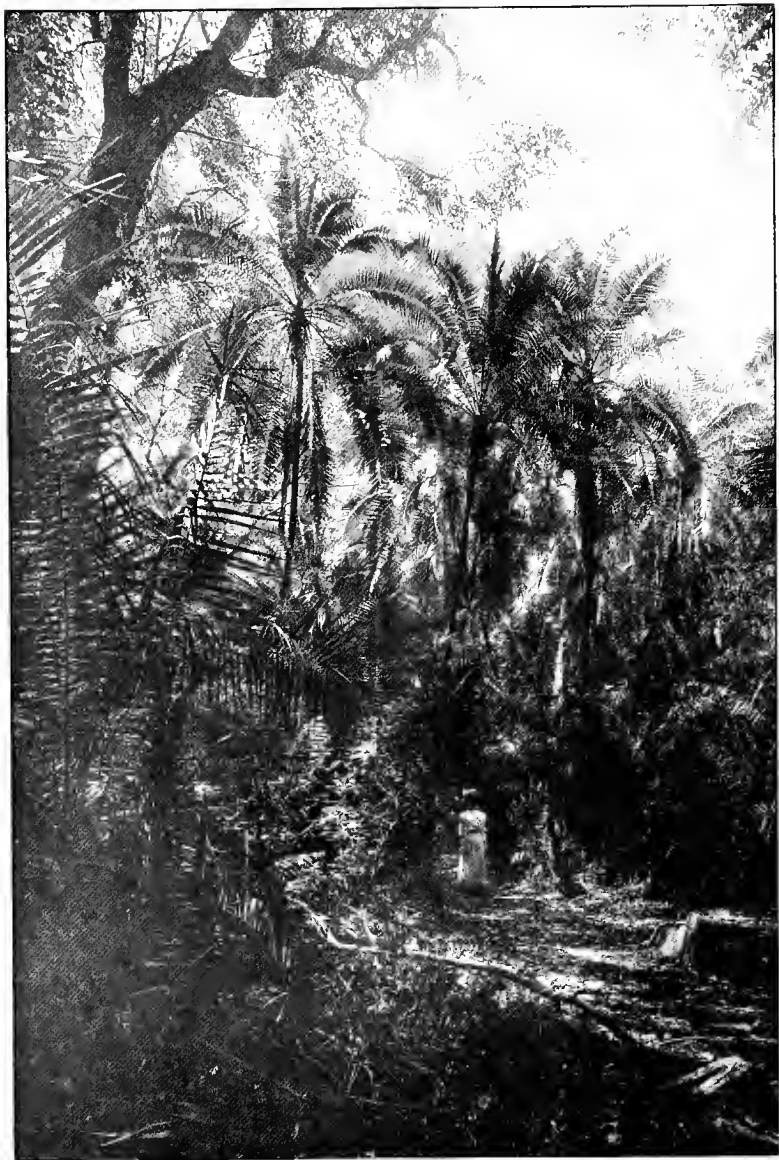
As we sit and gaze, we begin to appreciate the feeling of the untutored savages who, looking upon this weirdly moving scene,





THE ENTRANCE TO THE GORGE



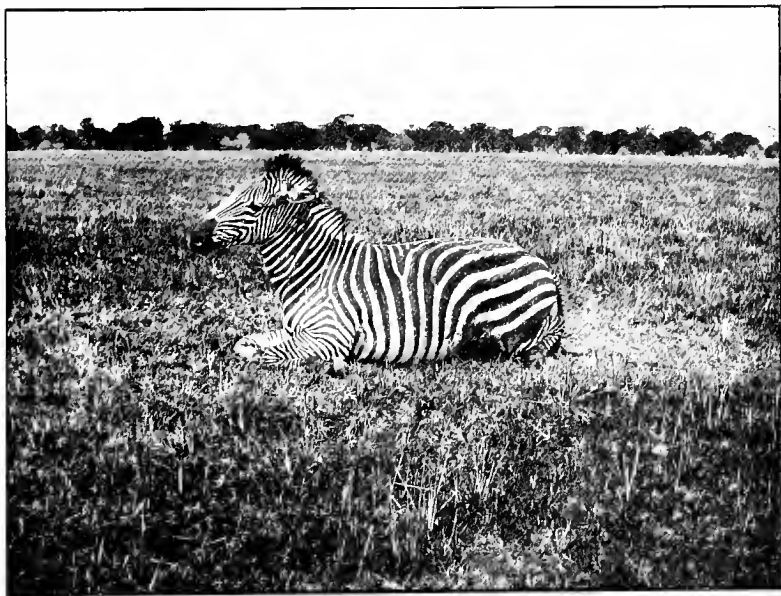


THE PALM GROVE.



tied the rank grass into knots to tell that the power of another was present there.

The Falls alone would be sufficient to impress the mind of the visitor deeply and permanently. But they do not stand alone. They are set in a gorgeous frame of beauty scarcely less impressive than the central ornament. They are the *pièce de résistance* in a gallery of beauty, but the gallery has charms of its own. Here Nature, "In verdure clad," rollicking in a riot of enchantment, tyrannises over the moods of the visitor. Not content with the majestic splendours of the Falls themselves Nature has thrown



ZEBRA.

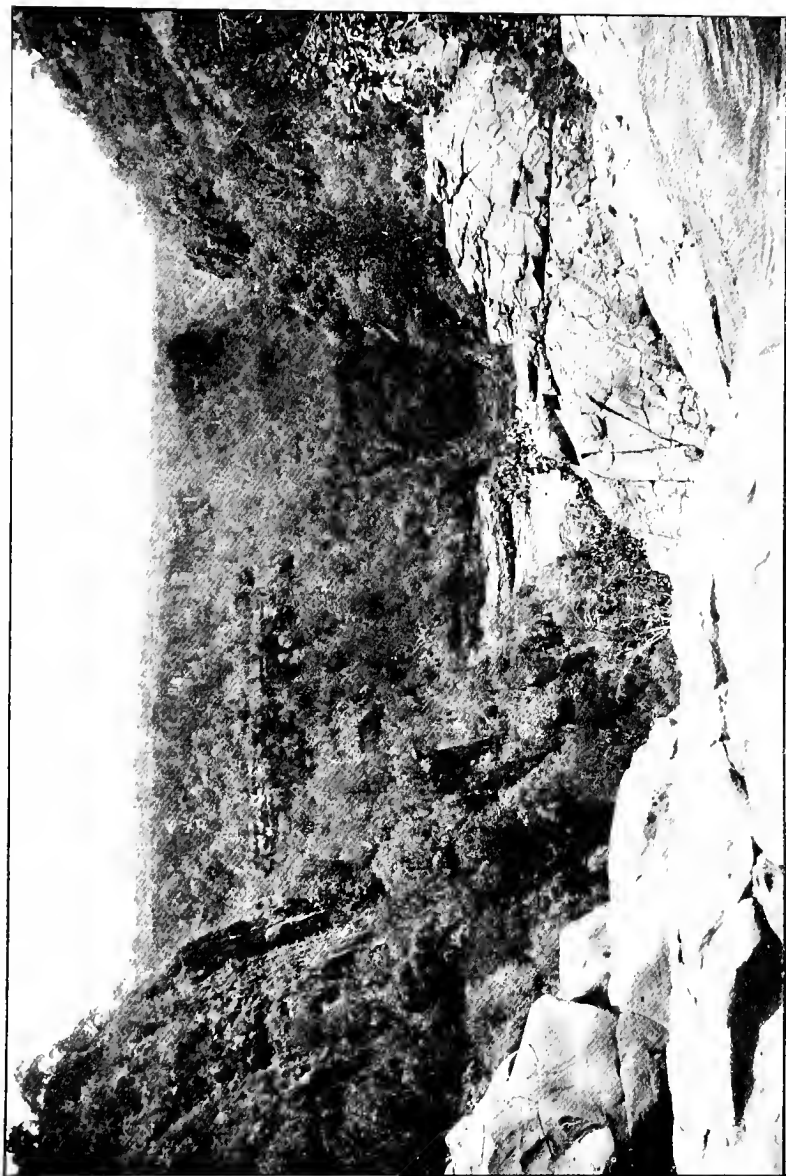
around them garlands of beauty, gathering from East and West the things that never fail to impress the mind and stir the heart. We navigate the upper waters of the river as an expansive lake and vary the pleasure by gliding around the countless isles spread before us like a miniature Hebrides. Graceful palms, lifting "their fronds in air," remind us of India or the Congo. Below, the Palm Grove carries the thought to the lovely island of Ceylon. On the southern bank, the Rain Forest, with its rich variety of ferns and orchids, its dancing rainbows and frolicking shadows, all set in the subdued splendours of a filmy light, makes one "doubt if Eden were more





THE KNIFE EDGE.





THE GORGE, FIVE MILES BELOW THE FALLS.



fair." The whole scene is wrapped in mystic garb of ambrosial sunshine and smites the heart with speechless wonderment.

Nor is this all of the glamour that gathers around Victoria Falls. They are cradled in the lap of an enticing but baffling mystery. Rhodesia has a romantic history. There is good reason to believe this is the land of Ophir of Bible times. Ancient queens of ebony beauty bedecked themselves with radiant jewels dug from the bowels of this land. Phœnicians and Persians doubtless hunted their treasure here. The ancient Arab, that prince of merchants, bartered for his wealth in this land of gold. The ancient Semite has left his mark on the stream of life, while ruined temples and forts tell of the height that far-off barbaric civilisation had reached. To-day, the spoor of elephants and leopards, the roar of lions, the horns of countless species of antelope remind us that Nature retains her primitive sway, waiting still for the marshalling and controlling genius of man.

A scene like this appeals to the wildest fancy, stimulates the most penetrating imagination, and moves even the sluggish mind to rapture and thrilling enchantment.

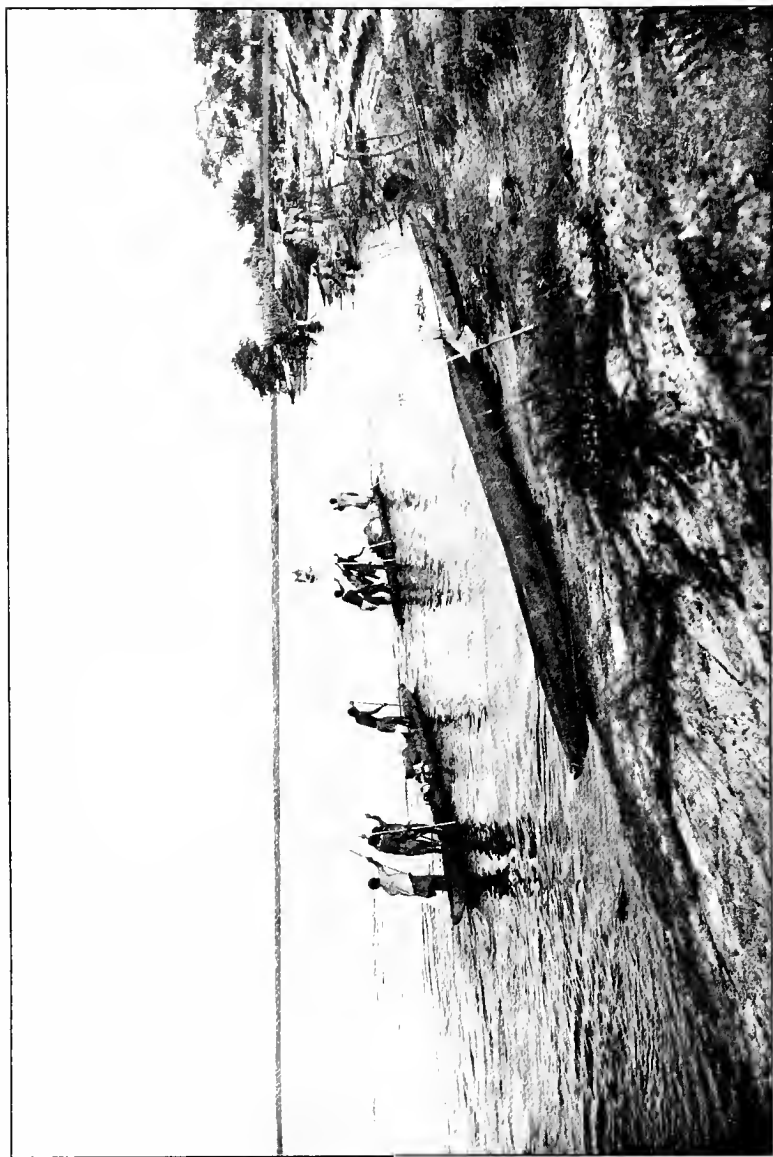






SEKOTI'S DRIFT.





DUG-OUTS ON THE UPPER ZAMBEZI.



### III

## THE ZAMBESI

THOSE familiar with South Africa, its high and dry plateaux, its arid wastes and desert plains, and others crossing a thousand miles of waterless country between Cape Town and Bulawayo, contrast at once the mass and volume of water at the Falls with the almost riverless sub-continent they have crossed to reach them. South African farmers who have spent their days on spacious farms whose only "fountain" is an artesian well, where an occasional torrent of rain falls to disappear in the sandy soil in a few hours, view with unconcealed surprise the massive torrents that pour ceaselessly into the unplumbed chasm at the Falls, and ask very pertinently whence it comes. South Africa cannot boast of mighty rivers. There is no navigable river south of the Zambesi. Many of its water-ways are dry for the greater portion of the year. Visitors to South Africa note with some amusement the long railway bridges that span the sinuous lines of sand here and there. Some have crossed the Karoo when a turgid stream has rushed madly along these river-beds, but have returned a few weeks later to find the stream vanished and the spoor of troops of game in the sand to tell that another kind of life now has the right-of-way. It is a pleasant surprise, therefore, to come across this magnificent river in the heart of Africa and watch its teeming waters play leapfrog over the precipice. But when the Karoo farmer asks how this volume of water comes to be in such a waterless country, he is unconsciously grappling with a problem that occupied the mind of the scientist long before the secret was known.

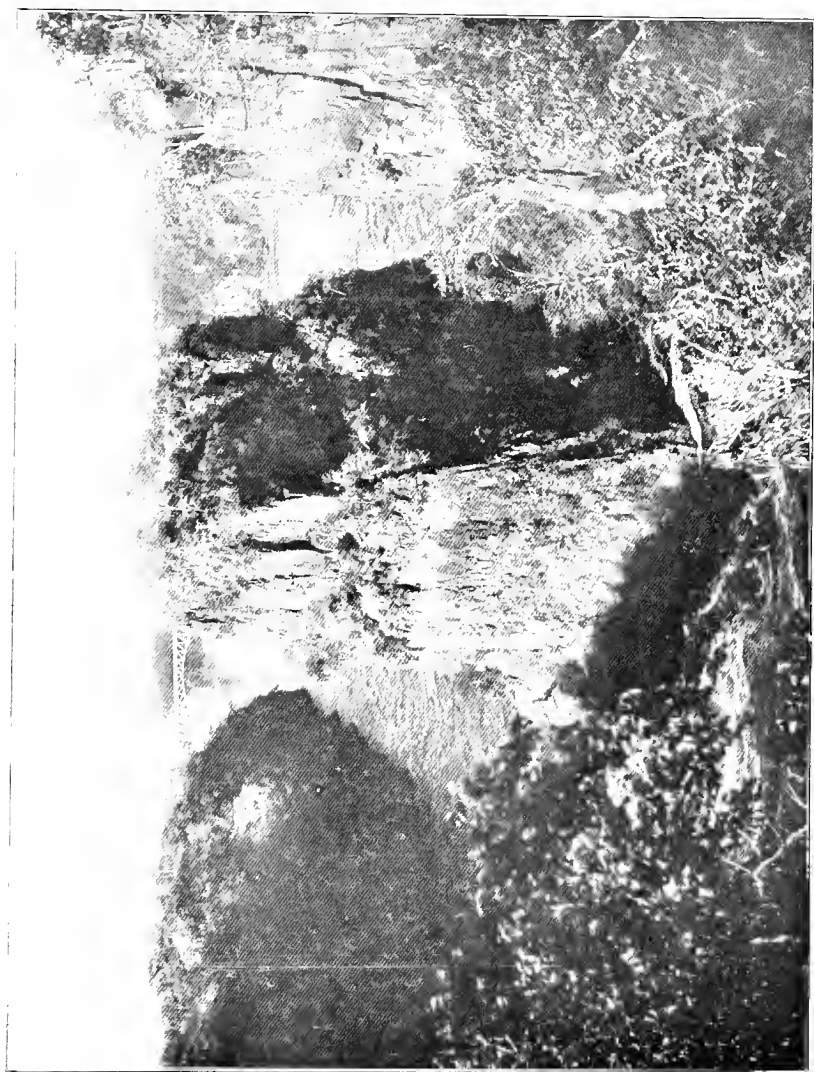
It was the ambition of Livingstone to demonstrate by survey and observation that the inland reaches of Africa formed a huge water-basin draining a vast area; but in the discovery the practical man was forestalled by the theorist. Livingstone had convinced himself of this by observation and survey, but on his return to Shesheke, in September 1855, he found a consignment of goods from London that had awaited his return for a year, among which was a paper by Sir Roderick Murchison advancing the theory Livingstone had now established. The explorer writes: "I discovered that my friend, Sir Roderick Murchison, while in his study in London, had arrived at the same conclusion respecting the form of the African Continent as I had lately come to on the spot . . . he had not only clearly enunciated the peculiar configuration as an hypothesis . . . but had even the assurance to send me out a





THE DATE PALM





THE FIRST BEND IN THE GORGE



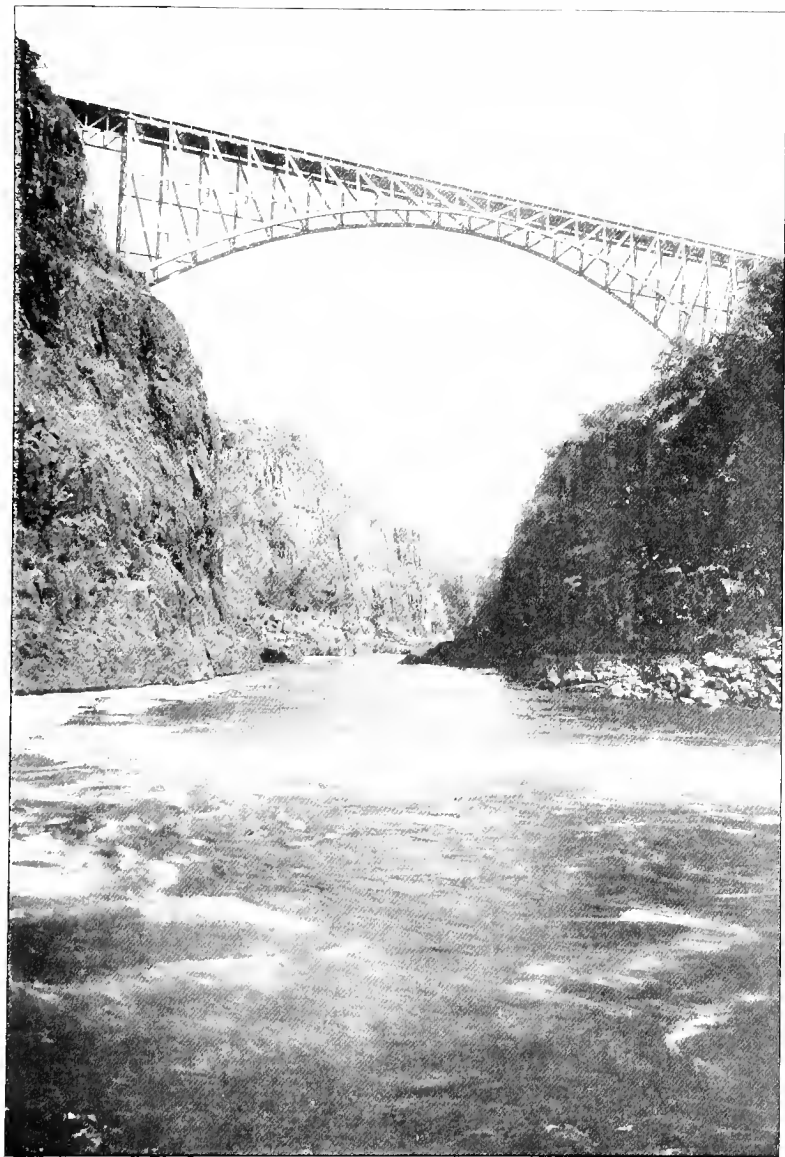
copy for my information." In his presidential address before the Royal Geographical Society in 1852 (p. 123), after setting forth in technical language his theory, Sir Roderick Murchison said: "Travellers will eventually ascertain whether the basin-shaped structure, which is here announced as having been the great feature of the most ancient, as it is of the actual geography of South Africa . . . does, or does not extend into North Africa. Looking at that much broader portion of the continent, we have some reason to surmise that the higher mountains also form, in a general sense, its flanks only."



IN A NATIVE KRAAL.

Readers will grasp this idea more easily by a glance at the map. On the southern side of the Zambesi we have the Kalahari and the Karoo, vast stretches of desert land of much higher altitude than the river-bed. The altitudes given in the South African Railway Guide show the traveller that, after climbing to elevations of four or five thousand feet, he gradually descends to the Falls. Kimberley reaches an altitude of 4,012 feet, Johannesburg 5,735, Mafeking 4,192, Bulawayo 4,469, while Victoria Falls station is only 2,994. From Livingstone we learn that similar conditions obtain in the northern bank. It is apparent, therefore, that the Zambesi drains an immense tract of country, and in this way sucks into its own veins the moisture of half a continent. In other words, the Zambesi is the drain pipe of a large part of Central Africa.





THE ZAMBESI BRIDGE





DAVID LIVINGSTONE. *Painted by Hugh Edinburg.*  
Supplied by the late Mrs. Livingstone-Bruce, (Livingstone's daughter.)



## IV

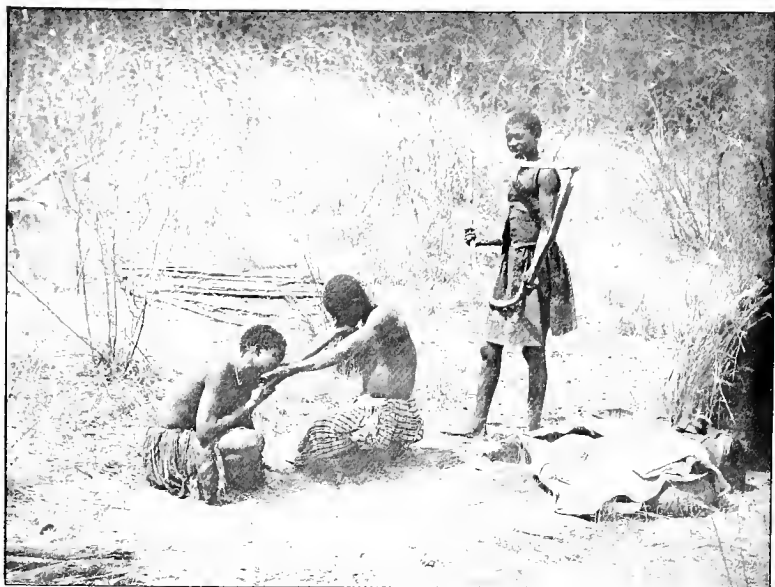
### DAVID LIVINGSTONE

DOCTOR DAVID LIVINGSTONE, the discoverer of the Falls, was<sup>1</sup> born March 19th, 1813, at Blantyre, a village on the Clyde.<sup>2</sup> It is interesting to note that he who was to do so much for the discovery and opening up of the water-ways of Africa first saw the light on the banks of a river. His boyhood was spent in a mill, working from 6 a.m. till 8 p.m., after which he attended night-schools where he qualified for the University. While studying at Glasgow he offered himself as a missionary to the London Missionary Society which sent him to South Africa, where he arrived in April, 1841. His first station was Kuruman, which meant a seven hundred miles' wagon journey from Port Elizabeth. The intrepid spirit of the explorer soon revealed itself, for within three months of his arrival at Kuruman he paid a visit to the Bakwain country. In 1843 he was appointed to Mabotsa. It was at Mabotsa that the famous lion episode took place. Livingstone, together with a few natives, went out to hunt lions, which had given much trouble to the neighbourhood, when he was attacked by a wounded beast and his left arm was badly mauled. He was never able to lift his arm without pain after this, and the false joint, which was formed through improper setting, led to the identification of Livingstone's body when it was brought to London by his faithful followers thirty years later. With the "wander-lust" in his blood Livingstone set out in 1849 on the journey in which he discovered Lake Ngami.

At this time Livingstone's great desire was to evangelise the natives further north, a policy in which he was generously supported by the Directors of the London Missionary Society. In 1844 Livingstone had married Mary Moffat, daughter of the great missionary of that name, and together they set out for Linyanti to visit the chief Sebituane in 1850, but when within sight of the great lake an epidemic of sickness among the party drove them back upon their base at Koloberg. Nothing daunted, Livingstone and his family set out once more for Linyanti in 1851, and in June of that year he penetrated to the Zambesi itself.

At this time Livingstone's great work began to call him. Feeling that he could not expose his wife and children to the





A BAROTSE SALUTATION



BAROTSE WATER-CARRIERS.

(The enclosure of poles is to prevent natives being carried off by crocodiles when drawing water.)



hazards of travel in uncharted lands among unknown peoples, he decided to send them to England, hoping to join them two years later. Accordingly he took them to Cape Town and saw them off to England. He now retraced his steps to Linyanti in the heart of Africa. From there, accompanied by twenty-seven natives, with a riding ox for use where possible, Livingstone cut through to the West Coast, arriving at Loanda May 31st, 1854. Retracing his steps to Linyanti, the intrepid explorer set out in November, 1855, to find a path to the East Coast. He had not gone far when he discovered Victoria Falls, the account of which will be found on another page. Pursuing his journey, he proceeded westward and reached Quilimane, north of the Zambesi, on the East Coast, in May, 1856. With massive daring and consummate skill, almost single-handed, this great traveller had marched from Cape Town to Linyanti, Linyanti to Loanda, Loanda to Quilimane, a distance abutting on 4,000 miles, in the space of four years.

Livingstone was no mere adventurer. He was a scientific explorer. It remains to his lasting credit that his surveys were accurate. Sir T. MacLear, the Astronomer Royal of the Cape, said of Livingstone and his work, "What that man has done is unprecedented. You could go to any point across the entire continent, along Livingstone's track, and feel sure of your position." Livingstone's track to Loanda is still used by travellers in those remote parts of the continent.

When Livingstone began his famous travels the heart of Africa was practically unknown, and the map of this great country a haunting blank. Livingstone did more than any single man to explore and open up this vast, unknown territory. A few of his discoveries may be set down here.

**LAKE NGAMI.** On the first day of August, 1849, Livingstone discovered Lake Ngami. At that time it was a large sheet of water measuring twenty miles by ten. Owing to the drying up process which seems to be going on in some parts of South Africa, Ngami is now little more than a boggy marsh and is almost dry.

**VICTORIA FALLS.** The date of the discovery of the Victoria Falls is frequently mis-stated. A common error is to assign it to November 5th, 1855. But the evidence of Livingstone's writings points to the date given in the "Encyclopædia Britannica," namely November 17th, 1855.

**LAKE SHIRWA.** Lake Shirwa was discovered by Livingstone in May, 1859.

**LAKE NYASSA.** On September 16th, 1859, Livingstone discovered Lake Nyassa, the third largest lake in Central South Africa. It is 350 miles long, and has an average width of 39 miles. It covers an area of 11,000 square miles.

**LAKE MOERO.** Livingstone discovered Lake Moero, November 8th, 1857. This lake is one of the feeders of the Congo River and





LIVINGSTONE ISLAND





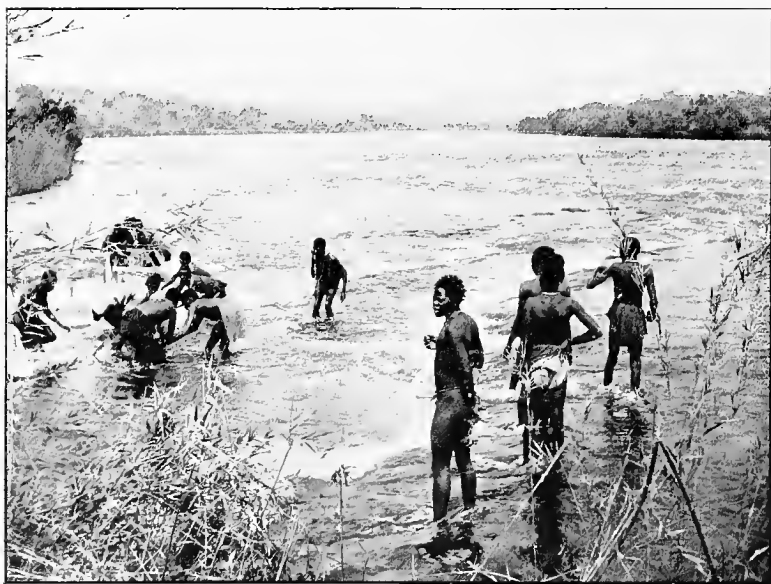
THE MAIN FALL FROM LIVINGSTONE ISLAND.



is separated from the Tanganyika by an isthmus of 90 miles. The Moero is 90 miles long.

**BANGWEOLO.** Lake Bangweolo was discovered by Livingstone July 18th, 1868. Like the Moero the Bangweolo feeds the Congo. It is over sixty miles long.

At Chitambe, on the banks of the Bangweolo, Livingstone was found dead upon his knees, on the morning of May 1st, 1873. His faithful followers, who had shared so many of his joys and sorrows, buried the heart and viscera four feet deep, dried the body in the



AN UPSET ON THE ZAMBESI.

sun for two weeks, encased it in the bark of a tree which they covered with carefully sewn sail, and strapping the melancholy burden to a long pole carried it to the coast, a distance of 1,500 miles. Thence they escorted it to London, and Livingstone found his grave amongst the immortals in Westminster Abbey. Even Livingstone's great achievements scarcely eclipse the heroic deed of his swarthy friends who, out of the love they bore him, hazarded and accomplished so much for the man whose name is written indelibly across the continent of Africa.



## VICTORIA FALLS DESCRIBED BY DAVID LIVINGSTONE

VICTORIA FALLS were discovered by the Rev. David Livingstone, M.D., LL.D., November 17th, 1855. The great traveller had often heard his native friends speak of the wonderful Falls. "One of the questions asked me by Sebituane was, 'Have you smoke that sounds in your country?' They did not go near enough to examine, but, viewing them with awe at a distance, said . . . 'Mosi-oa-tunya' (smoke does sound there)." With characteristic terseness these rude children of nature had expressed some of the essential features of the scene. When Livingstone found these impressive Falls he gave to them the name of the reigning sovereign, the only time, as he tells us, that he christened any of Africa's scenes with an English name.

The native name, "Mosi-oa-tunya," is most appropriate, for the huge column of spray has been seen distinctly at a distance of twenty-eight miles from the Falls, rising like a cloud of smoke, while the roar of the thunderous torrent can be heard at a distance of sixteen miles when the river is in flood.

The Falls extend for a mile and a quarter from end to end, and the drop from the brink into the chasm is a distance of four hundred and twenty feet. The exit from the chasm is three quarters of a mile from the western end and is about one hundred and fifty yards wide. Through this narrow outlet the entire volume of water from the Falls rushes at a terrific rate, and passing under the great bridge, zigzags its way through a gorge extending for forty-five miles, until it finds a comparatively easy course to the Indian Ocean.

The Falls await still a pen to adequately describe them. When the genius equal to the task arrives he will be found to be both poet and word-artist. Moreover, he must be an adventurer, for only one of iron nerves and indomitable pluck can descend, and climb, to the points where the secrets of this marvellous scene are learned. So far there is no description equal to that of the gallant Livingstone who first looked on the scene, and we therefore give his account in full.

"After twenty minutes' sail from Kalai, we came in sight, for the first time, of the columns of vapour, appropriately called 'smoke,' rising at a distance of five or six miles, exactly as when large tracts of grass are burned in Africa. Five columns now arose, and, bending





THE RAINBOW FALL FROM LIVINGSTONE ISLAND.



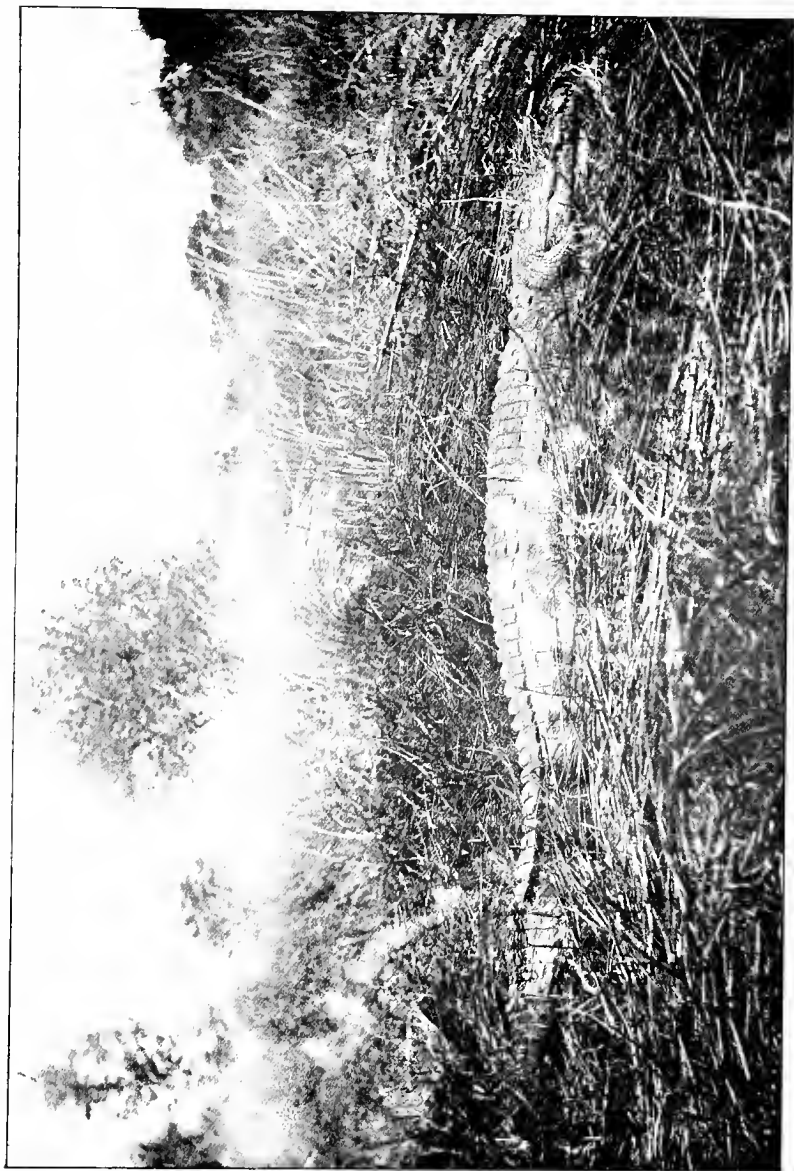


NAME-TREE OF DAVID LIVINGSTONE.



in the direction of the wind, they seemed placed against a low ridge covered with trees ; the tops of the columns at this distance appeared to mingle with the clouds. They were white below, and higher up became dark, so as to simulate smoke very closely. The whole scene was very beautiful ; the banks and islands dotted over the river are adorned with sylvan vegetation of great variety of colour and form. At the period of our visit several trees were spangled over with blossoms. Trees have each their own physiognomy. There, towering over all, stands the great, burly baobab, each of whose enormous arms could form the trunk of a large tree, beside groups of graceful palms, which, with their feathery-shaped leaves depicted in the sky, lend their beauty to the scene. As a hieroglyphic they always mean 'far from home,' for one can never get over their foreign air in a picture or a landscape. The silvery Mohonono, which in the tropics is in form like the cedar of Lebanon, stands in pleasing contrast with the dark colour of the motsouri, whose cypress-form is dotted over at present with its pleasant scarlet fruit. Some trees resemble the great spreading oak, others assume the character of our own elms and chestnuts ; but no one can imagine the beauty of the view from anything witnessed in England. It had never been seen before by European eyes ; but scenes so lovely must have been gazed upon by angels in their flight. The only want felt is that of mountains in the background. The Falls are bounded on three sides by ridges three hundred or four hundred feet in height, which are covered with forest, with the red soil appearing among the trees. When about half a mile from the Falls I left the canoe by which we had come down thus far, and embarked in a lighter one, with men well acquainted with the rapids who, by passing down the centre of the stream in the eddies and still places caused by many jutting rocks, brought me to an island situated in the middle of the river, and on the edge of the lip over which the water rolls. In coming hither there was danger of being swept down by the streams which rushed along on each side of the island ; but the river was low, and we sailed where it is totally impossible to go when the water is high. But though we had reached the island and were within a few yards of the spot, a view from which we could solve the whole problem, I believe that no one could perceive where the vast body of water went ; it seemed to lose itself in the earth, the opposite lip of the fissure into which it disappeared being only eighty feet distant. At least I did not comprehend it until creeping with awe to the verge, I peered down into a large rent which had been made from bank to bank of the broad Zambesi, and saw that a stream of a thousand yards broad leaped down a hundred feet, and then became suddenly compressed into a space of fifteen or twenty yards. The entire Falls are simply a crack made in a hard, basaltic rock from the right





CROCODILE.



to the left bank of the Zambesi, and then prolonged from the left bank away through thirty or forty miles of hills. If one imagine the Thames filled with low tree-covered hills immediately beyond the tunnel, extending as far as Gravesend; the bed of black basaltic rock instead of London mud, and a fissure made therein from one end of the tunnel to the other, down through the keystones of the arch, and prolonged from the left end of the tunnel through thirty miles of hills; the pathway being a hundred feet down the bed of the river instead of what it is, with the lips of the fissure from eighty to one hundred feet apart; then fancy the Thames leaping



TOM-TOMS.

bodily into the gulf; and forced there to change its direction, and flow from the right to the left bank; and then rush boiling and roaring through the hills—he may have some idea of what takes place at this, the most wonderful sight I had witnessed in Africa. In looking down into the fissure of the right of the island, one sees nothing but a dense white cloud, which, at the time we visited the spot, had two bright rainbows on it. (The sun was in the meridian, and the declination about equal to the latitude of the place.) From this cloud rushed up a great jet of vapour exactly like steam, and it mounted two hundred or three hundred feet high; there con-



densing, it changed its hue to that of dark smoke, and came back in a constant shower, which soon wetted us to the skin. This shower falls chiefly on the opposite side of the fissure, and a few yards back from the lip there stands a straight hedge of evergreen trees, whose leaves are always wet. From their roots a number of little rills run back into the gulf; but as they flow down the steep wall there, the column of vapour, in its ascent, licks them up clean off the rock, and away they mount again. They are constantly running down, but never reach the bottom. On the left of the island we see the water at the bottom, a white rolling mass moving away



MAKING "HIPPO" BELTONG.

to the prolongation of the fissure, which branches off near the left bank of the river. A piece of the rock has fallen off on the left of the island, and juts out from the water below, and from it I judge the distance which the water falls to be about a hundred feet. The walls of this gigantic crack are perpendicular, and composed of one homogeneous mass of rock. The edge of the side over which the water falls is worn off two or three feet, and pieces have fallen away, so as to give it somewhat of a serrated appearance. That over which the water does not fall is quite straight, except at the left corner, where a rent appears, and a piece seems inclined to fall



off. Upon the whole, it is nearly in the state in which it was left at the period of its formation. The rock is dark brown in colour, except about ten feet from the bottom, which is discoloured by the annual rise of the water to that or a greater height. On the left side of the island we have a good view of the mass of water which causes one of the columns of the water to ascend, as it leaps quite clear of the rock, and forms a thick unbroken fleece all the way to the bottom. Its whiteness gave the idea of snow, which I had not seen for many a day. As it broke into (if I may use the term) pieces of water, all rushing on in the same direction, each gave off

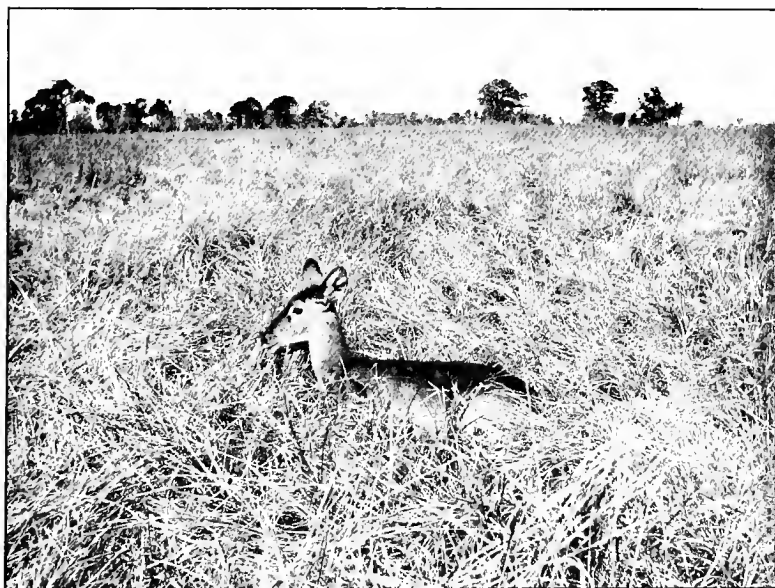


GIRAFFE IN THICK BUSH.

several rays of foam, exactly as bits of steel, when burnt in oxygen gas, give off rings of sparks. The snow-white sheets seemed myriads of small comets rushing on in one direction, each of which left behind its nucleus rays of foam. I never saw the appearance referred to noticed elsewhere. It seemed to be the effect of the mass of water leaping at once clear of the rock, and but slowly breaking up into spray. I have mentioned that we saw five columns of vapour rising from this strange abyss. They are evidently formed by the compression suffered by the force of the water's own fall, into an unyielding wedge-shaped space. Of the five columns, two on the right and one on the left of the island were the largest, and



the streams which formed them seemed each to exceed in size the falls of the Clyde at Stonebyres when the river is in flood. This was the period of low water, in the Leeambye, but, as far as I could guess, there was a flow of five or six hundred yards of water, which, at the edge of the fall, seemed at least three feet deep. I write in the hope that others more capable of judging distances than myself will visit the scene, and I state simply the impressions made on my mind at the time. I thought, and do still think, the river above the Falls to be one thousand yards broad; but I am a poor judge of distances on water, for I showed a naval friend what



PUKU.

I supposed to be four hundred yards in the bay of Loanda, and, to my surprise, he pronounced it to be nine hundred. I tried to measure the Leeambye (i.e., Zambesi) with a strong thread, the only line I had in my possession, but when the men had gone two or three hundred yards, they got into conversation and did not hear us shouting that the line had become entangled. By still going on they broke it, and, being carried away down the stream, it was lost on a snag. In vain I tried to bring to my recollection the way I had been taught to measure a river, by taking an angle with the sextant. That I once knew it, and that it was easy, were all the lost ideas I could recall, and they only increased my vexation.



However, I measured the river farther down by another plan, and then I discovered that the Portuguese had measured it at Tete, and found it a little over one thousand yards. At the Falls, it is as broad as at Tete, if not more so. Whoever may come after me will not, I trust, find reason to say I have indulged in exaggeration."

Livingstone cannot be charged with exaggeration. His failure to guess the accurate distance at Loanda is repeated in his figures relative to the Victoria Falls. It reveals the man of caution, who, though his admiration might be moved to a superlative degree, has nevertheless sufficient command of his reason to avoid exaggeration for mere momentary effect.

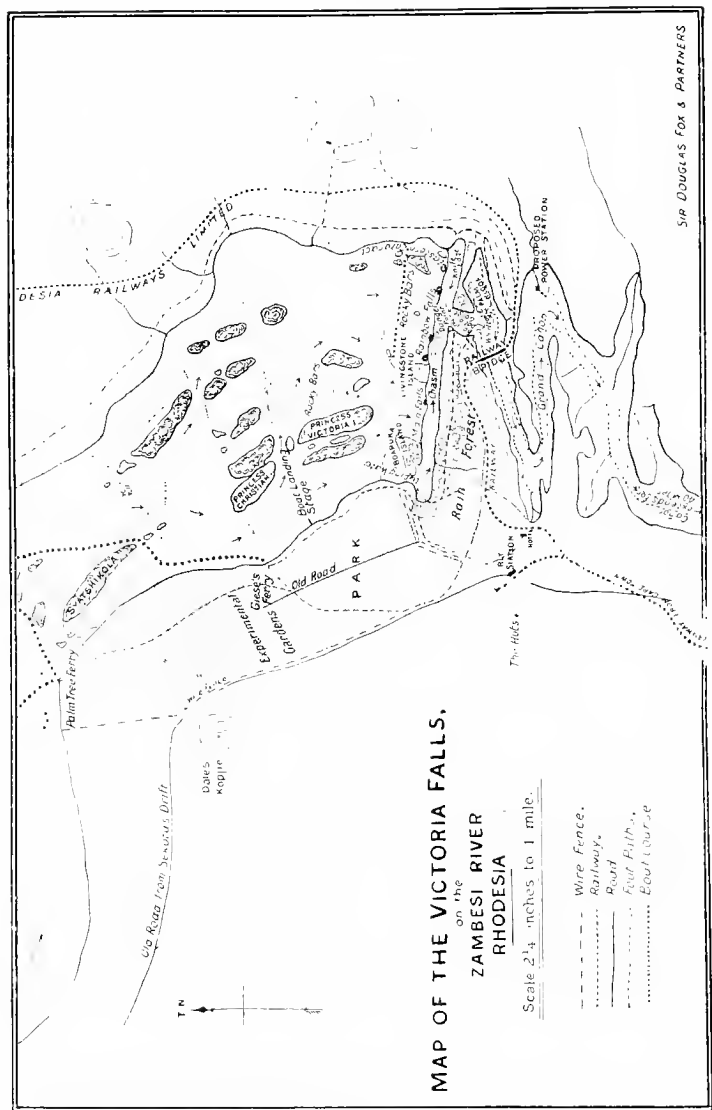






ON THE UPPER ZAMBEZI.





PLAN OF VICTORIA FALLS.

SIR DOUGLAS FOX & PARTNERS



## VI

### HOW TO SEE THE FALLS

It is not easy to give a complete and satisfactory guide to those who desire to see all the beauty and feel all the charm of the Victoria Falls. Very much depends upon the visitor himself. As was said in an earlier note, the eye sees only what it brings power to see, and we need to know both the quality of another's nerves and the direction of his tastes before we can advise him as to the exact course he should pursue. But a few general observations may be made.

Victoria Falls must be regarded as a magnificent picture set in an exquisite gallery and, therefore, the questions of light and angles of vision are of first importance. Not the least of the marvels of the Falls is the variety of impressions they produce, and these must be accounted for by the temperament of the visitor and the hour in which his visit is made. The impressions produced on the same mind vary with time and light. Some are impressed by the volume of the immeasurable power of the mighty Falls. Some find the scenic effects the most enchanting and retain the picture of dancing rainbows, now subdued and again glowing, as the most cherished memory. Others, weirdly impressed by the uniqueness of the Rain Forest, have tried to translate their impressions into verse.

In reality, the Falls provide a feast of sensations for those endowed with a susceptible nature. It is difficult to imagine anything more weirdly impressive than the Rain Forest on a dark night. Inky darkness divorced from the profound silence so often associated with it, the gleam of dancing water seen occasionally through the trees, the thunderous roar which seems to rise from the bowels of the earth, the ceaseless drip, drip, drip of condensed spray falling from the trees is something not easily forgotten. But the effect is entirely different if we visit the Rain Forest on a clear, moon-lit night. Following its winding paths in this friendly gloom every nerve is alert as the lunar shadows, with bewitching caprice lying at a thousand angles around us, start phantoms in the brain or send a shiver through the frame. It requires nerves of steel to stand on the rocks of Danger Point, or to negotiate the Knife Edge in the night-time, while few would essay the task of visiting Livingstone Island in the darkness. These are but a few of the sensations



to be had at the Falls, but they illustrate the difficulty of offering a complete guide to those who would "see all, nor be afraid."

Those who desire to see the rainbows at their best must carefully time their visits. Few will require to be reminded that rainbows vary in size and clearness with the position of the sun. Just after sunrise large rainbows may be seen leaping up from the abysmal depths, arching themselves far over the southern lip of the chasm; but as the sun climbs the meridian and its rays are consequently more vertical, the rainbows become smaller and smaller until, at last, they dance like elves and fairies far down the chasm or play hide and seek in the Rain Forest. It follows, therefore, that a series of visits at different times of the day will reveal a variety of rainbows both in size and clearness. Providing the visitor is fortunate in his selection of time he can regale himself not only with the sight of many rainbows; he may witness the rare beauty of reflected rainbows also.

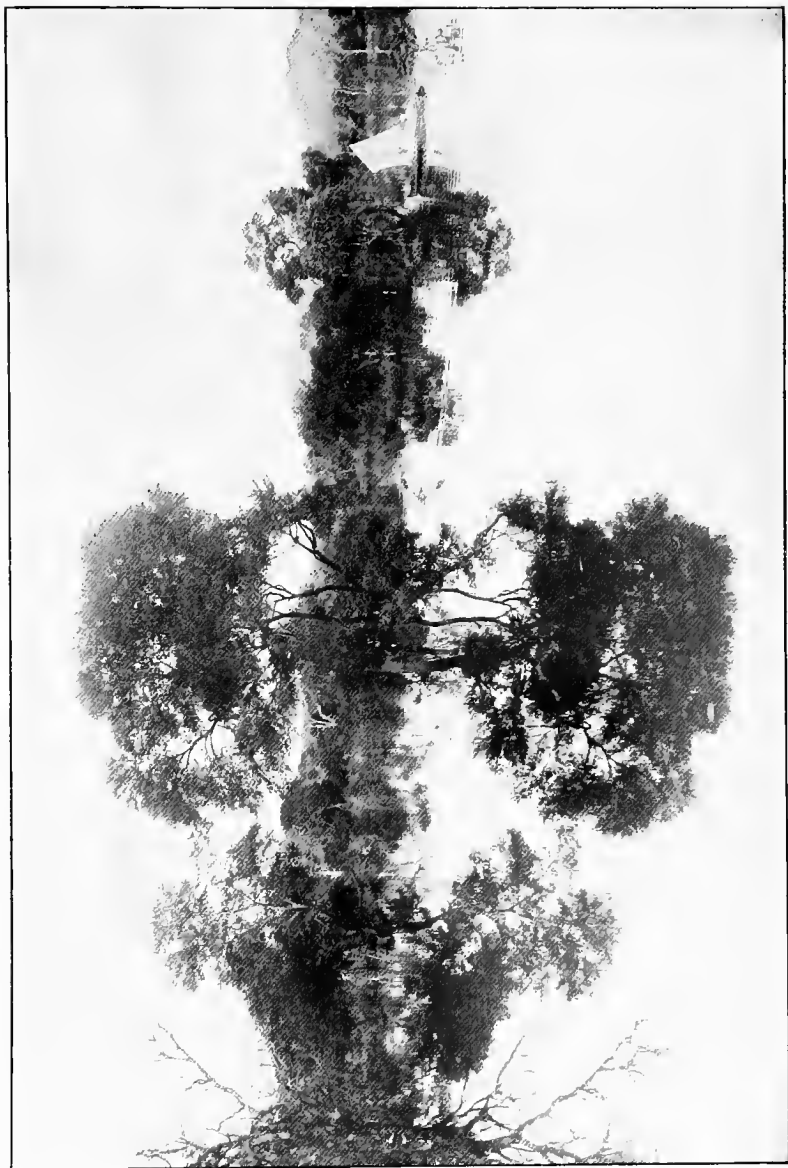
These remarks apply with equal cogency to the lunar rainbows to be seen at the Falls. The largest lunar rainbows are to be seen when the moon is full and within two hours of moonrise. At such a time the visitor may see magnificent lunar rainbows springing from the depths of the Gorge, spanning the chasm and girdling the Rain Forest with spectroscopic ribbons. Such a sight is not dependent on the visitor's imagination. It is not a single streak that is called a rainbow because no other name describes the appearance. There may be a succession of lunar rainbows clearly defined against the wooded shades of the background which the eye can neither doubt nor escape. A favourite spot from which to view this unique spectacle is Danger Point.

But there are tangible things of beauty at the Falls also. Much has been said about the Rain Forest but it must be referred to again. The name was first applied to this spot by Edward Moir in 1870. In one respect the thing belies the name. It is not a forest in the sense of being a vast expansive stretch of giant trees. Its extent would be best described by the English term copse, or wood. Nor is it always raining here, if we mean by rain, water discharged from clouds in leaden skies. But if the term rain be applied to water falling from overhead, regardless of cloud and sky, then it is always raining here.

The Rain Forest is situated on the southern lip of the chasm parallel with the actual Falls. Livingstone himself has described the trees in the extract given in another place. They are decorated with a variety of climbers, and monkey ropes dangle in the air. In the friendly shelter of the wood orchids flourish without the care of man. Lilies revel in the cool, moist shade, and baby maidenhair ferns in teeming numbers flourish in a world to their liking. It is a magnificent conservatory requiring nothing from man but admiration and appreciation.



REFLECTIONS.





The ceaseless rain is supplied by the condensation of the spray from the Falls which rises to a thousand feet and falls again in ceaseless drip, bathing the trees with perpetual showers and ministering to the life of plants and ferns below.

From the Rain Forest the most comprehensive views of the Falls are to be had. The average distance from the vantage points in the Rain Forest to the actual Falls is one hundred and forty yards. Here and there safe paths dart out of the heart of the Forest to the edge of the precipice. The Falls, which are seen only in fragments from other points, may be seen in all their glorious expanse from the fringe of the Rain Forest. Directly in front is the Main Fall, to the right is the Rainbow Fall; to the left the Devil's Cataract tosses and roars like a demon pantomime, and below are the churning waters of the fearsome chasm.

Most visitors find pleasure in descending to the water's edge in the Gorge. There are several safe and well-defined paths leading to the desired goal. One of these is immediately in front of the hotel. For the greater part of the way the path is fairly good, but as it dips to the water's edge it is difficult though not dangerous.

There are some paths practicable to men of strong nerve only. Two of these may be mentioned here. At the northern extremity of the bridge, that is, the end farthest from the hotel, the visitor may proceed through a gap on the right of the railway cutting. From this eminence a panoramic view of the lower river is obtained. Stretching before us is the second bend of the gorge through which an apparently sluggish mass of water moves, giving the impression of vasty deeps, infinitely mysterious in appearance, while swishing whirlpools churning first in one place then in another warn us of the danger of trying to negotiate the terrific stream. Men of strong nerve may descend from this point to the water's edge in the cavernous deep, where disciples of Izaak Walton find good sport as a recompense.

Another descent practicable for men in good command of themselves is as follows. An iron ladder is noticeable as part of the structure of the bridge. Descend the ladder to the foundations of the bridge. At the base of the ladder a trail may be observed leading under the bridge and following a small waterway, which leads to the water's edge at the bottom of the Gorge. With the rocks above scaling heights of upwards of four hundred feet and the graceful bridge spanning the Gorge high over his head, man feels but an insignificant atom.

While these descents are available for men of steel nerves only one trip to the water's edge is practicable to all and offers a minimum of risk. This is *via* the Palm Grove. Crossing the bridge once more to its northern extremity the visitor finds on his left a small flight of steps. Ascending these he soon discovers that he is on the northern bank of the river. Before him is a good





THE "BOILING POT."



road dotted with signposts directing him to the entrance of the Palm Grove. From the head of the Grove a path is visible leading to the shady recesses of the Palms. Though it is neither of macadam nor asphalt the path is good and safe, and by this way lady visitors may reach the edge of the "Boiling Pot" with ease.

The Palm Grove, like the Rain Forest, belies its name somewhat for there are not the number of palms the label might lead us to expect. But though the palms may be comparatively few in number the Grove has a fascination of its own. As we descend, the fronded palms cast their graceful shadows in flickering coils at our feet, the half human cry of baboons as they troop from tree to tree reaches our ears, and the thunderous moan of the Falls is dominant over all. At the end of the path are a number of boulders not too large to be negotiated with ease. Picking his way over these, the visitor finds himself at the edge of the "Boiling Pot," a seething pool of water some three hundred feet across. The churning waters hiss and swirl as the contents of a mammoth cauldron. It is a modern Avernus Lacus. The ingenuity of man has devised no means for sounding its depths. A fifty-pound weight on an iron cable was tossed about like a cork when engineers tried to plumb its deeps. Seated here on the rocks, paddling in the mad water that has eddied into pools among the rocks, we sit and muse. We seem to have descended the under-world with Dante and Virgil. Here the power of man is set at nought, and ambitious genius stands agape. Lizards dart and dodge about the rocks, stopping for a second to gaze at the dumb animals before them. We look up to the verdant, precipitous rocks, reared "not by force of fire, but art divine"; we watch the gigantic Falls dashing headlong into the abyss; we gaze upon the wonderful bridge, almost sheer above us, spanning the Gorge with one giant stride of six hundred and ten feet, and rearing its graceful framework four hundred feet above our heads; we watch the steamy spray as the white smoke of a vulcan's forge while the torrent of an immense river a mile broad over our heads forces its way in devilish fury through the narrow gateway in front of us; and we ask: "What is man?"

To those visiting the Falls for one day only, we offer the following suggestions.

Leaving the hotel and crossing the rustic bridge, two paths will be observed. The visitor should take the path to the right, which leads to the bridge (toll 1s.). Standing on the bridge (which is the highest in the world), a magnificent view of the Gorge and "Boiling Pot," and of the "Rainbow Fall," may be had, and the visitor will doubtless tarry awhile to drink in the beauties of the scene. Proceeding on the journey across the bridge, and at the extreme or north end, and ascending a flight of steps, a magnificent panorama is presented to the view. Proceeding along a well-defined path leading to the eastern cataract, a bird's-eye view of the "Palm





THE MAIN FALL IN FLOOD.





BAOBAB TREE.

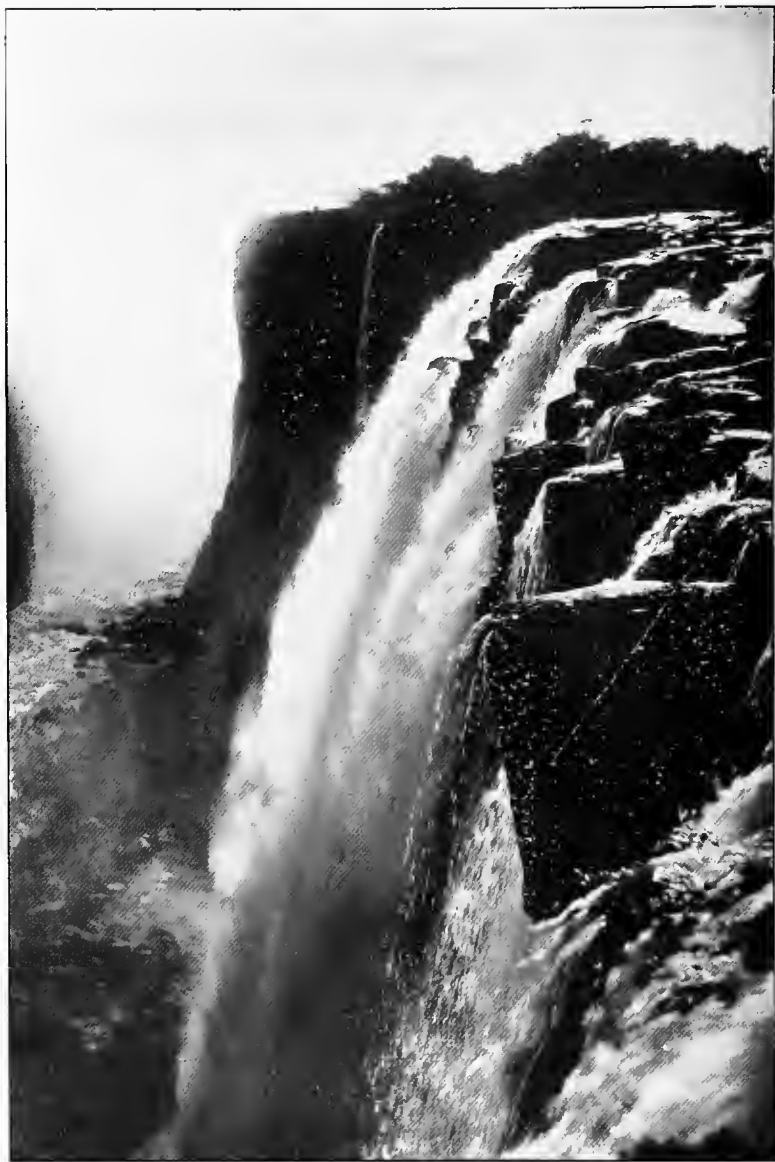


Grove," and a glimpse of the "Rainbow Fall" is caught over the "Knife Edge" (a depression in the wall of rock facing the Falls). Continuing the path, the Eastern Cataract is reached, from which spot can be seen a grand view of the Rainbow Falls, and under favourable conditions one can see far up the chasm. Wonderful rainbow effects are also to be observed, and usually in addition a reflection of the rainbow itself. A few steps further and the Rapids above the Eastern Cataract burst into view in all their grandeur.

Retracing one's steps and following the path facing the Falls, one reaches the "Knife Edge," which can be comfortably crossed by those whose nerves are in good condition, but ladies are advised not to attempt the crossing. On returning, a path on the right hand is disclosed which leads to the Palm Grove and the "Boiling Pot," situated at the bottom of the Gorge, from which spot a splendid view of the Zambesi Bridge is seen, and of the huge volume of water rushing through the Gorge and under the bridge.

Again crossing the bridge, pass on to "Danger Point," which is immediately above the entrance to the Gorge, from which point walk along the edge of the chasm, passing into the Rain Forest, which, with its wealth of tropical verdure, and splendid view of the Falls, is one of the most enjoyable sights in the vicinity. In the Rain Forest is a well-made path which visitors should follow, at intervals taking the tributary paths leading towards the edge of the Rain Forest and facing the Falls. From one's entrance at "Danger Point" heavy showers equal to tropical rain will be encountered, and visitors should provide themselves with mackintoshes and stout boots. The Rain Forest, as shown in the accompanying plan, runs parallel to the great portion of the Falls, and the Forest with its wealth of ferns, palms, huge trees festooned with monkey-ropes, and moss-grown trunks of trees lying promiscuously around, are a continual feast to the eye. At every few yards the scene is changed, infant rainbows dancing attendance, keeping just out of reach. Soon after entering the Forest, Livingstone Island is seen, separating the Rainbow Fall from the Main Fall. Emerging from the Rain Forest, and bearing to the right, one encounters the "Leaping Water" or "Devil's Cataract," situated at the western end of the Falls, and commanding a truly magnificent view of the Falls on the left, and the beautiful sheer cliffs covered with the verdant foliage of the Rain Forest; a truly magnificent sight, and one which brings home the tremendous glory of the whole mighty work of Nature, and the comparative insignificance of humanity.





THE ROCK FORMATION.



## VII

### VICTORIA FALLS : COMPARATIVE NOTES

THE superb and massive grandeur of Victoria Falls may be best appreciated by comparison with other Falls. There is an extensive literature on the various well-known waterfalls in different parts of the world, for these beauty spots appeal to the æsthetic sense of all travellers. It would be too much to attempt to give a complete survey of such attractions in an album like this, but a few of them may be passed in review.

There are greater and lesser lights in the firmament, as all the world knows, and while South Africa has the proud distinction of supplying the traveller with the greatest and most wonderful waterfall known, it supplies also many tumbling rivers whose cascades awaken pleasurable emotions in the breast of the visitor.

The Howick Falls in Natal have a local fame to which they are justly entitled. At an altitude of 3,439 feet above sea level, and some ninety miles from Durban, the Umgeni River dashes over a precipice of 360 feet, forming beautiful cascades with an aggregate descent of 350 feet. The accompanying picture shows that this tossing water is not a negligible thing in the world's galaxy of beauty.

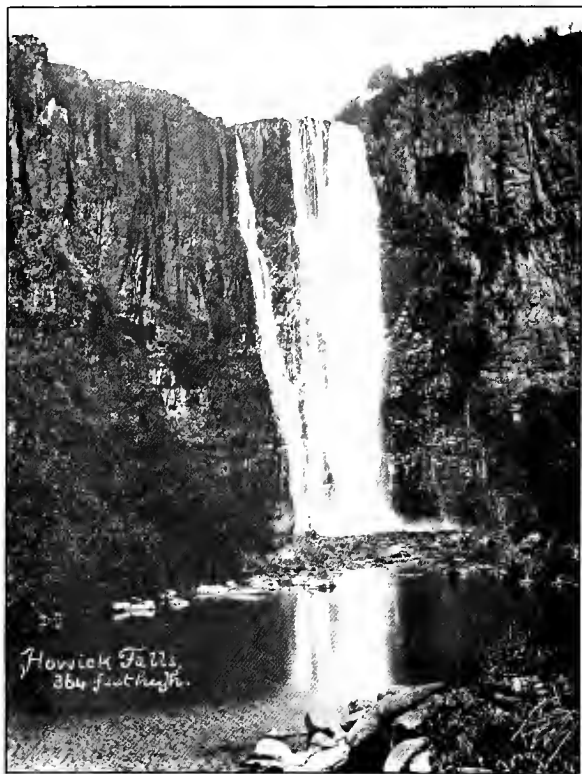
Basutoland, again, has the distinction of supplying what is probably the loftiest waterfall known in South Africa. The Malutsenyane Falls have an estimated fall of 700 feet. The picture shown herewith gives some idea of the enormous height, but it will be seen that the width of the stream is not great. Unfortunately these falls are difficult of access, requiring some days of mountain travel to reach them.

But while smaller streams furnish us with pretty scenes we have to turn to mighty rivers to find anything that can be reasonably compared with Victoria Falls. The Victoria Falls are not the only ones the Zambesi can boast ; there are others displaying their full grandeur at a glance in such a way as to appeal strongly to the admiration of the onlooker. Such are the N'gonya Falls. These are situated in Barotseland, some 250 miles above those discovered by Livingstone. The pictures shown herewith will appeal to all lovers of the beautiful. For a complete scenic display it would be difficult to find their equal. They have an advantage over their more famous neighbours in that they reveal their full glory



at a glance. The Zambesi at this point is three quarters of a mile wide. The N'gonya Falls have an average drop of 55 feet, while the volume of water varies to the extent of 16 or 18 feet between the extreme wet and extreme dry season.

The only real rival of Victoria Falls for premier honours in the list of waterfalls is the Niagara Falls. For generations the American



*Photo by John Butler, Esq.*

THE HOWICK FALLS.

Falls held unchallenged sway in this field, and it was only after the railway was opened to Victoria Falls in 1904 and travellers from all quarters began to visit the magnificent scene that Niagara Falls receded to second place. It is in some respects unfortunate that the two gigantic waterfalls are forced into competition for the world's admiration for, after all, the competition is between things that are dissimilar in many respects. But as most visitors ask for



comparative facts and figures we set down in brief some particulars that will help each to decide for himself. Figures relative to both are by no means uniform, but choosing those that should command the confidence of all readers we cull from the *Encyclopædia Britannica* a note on Niagara Falls, and append the Rhodesian Government figures on Victoria Falls.



[Photo by John Butler, Esq.]

SHELTER CASCADE, HOWICK.

The *Encyclopædia Britannica* says of the American Falls: "They are in two principal parts separated by an island. The greater division, adjoining the left bank, is called the Horseshoe Fall. The height is 155 feet, and the length of its curving crest is 2,600 feet. The American Fall adjoining the right bank is 162 feet high, and about 1,400 feet broad. The flow of the river at its mean stage is 222,000 cubic feet per second, at the low stage 176,000 cubic



feet. The descent of the Falls, and in the rapids just above them, affords a theoretical waterpower equal to nearly 4,000,000 horsepower, and it is estimated that practically three quarters of this is available. The annual value of the power must be reckoned in millions. About 15,000 cubic feet of water per second are used for development of electrical power. As the development of the



*Photo by Rev. W. Angu*  
MALUTSENYANI FALLS, BASUTOLAND.

economic value involves the diversion of the water from its channel, and the destruction of the cataract as a scenic feature, the economic and æsthetic interests are antagonistic."

Niagara Falls differ from Victoria Falls in one important particular. While the Zambesi tosses headlong over a level sheet of basaltic rock, the Niagara rushes over limestone cliffs. The result is, while the Victoria Falls remain but slightly changed





N'GONYA FALLS, BAROTSELAND.



N'GONYA FALLS, BAROTSELAND.



throughout the ages, the limestone cliffs of Niagara are being gradually washed away. It is estimated that every year the river takes away 5 feet of the promontory and, it is said, the Horseshoe Fall has worn back the cliff 335 feet in 63 years.

On the other hand, the outline of Victoria Falls has undergone no appreciable change during the time it has been under observation, owing, of course, to the adamant nature of the precipice.

Turning now to the figures supplied to us by the Surveyor General of Northern Rhodesia, we find a marked difference between the two great waterfalls in width and fall. At the point where the



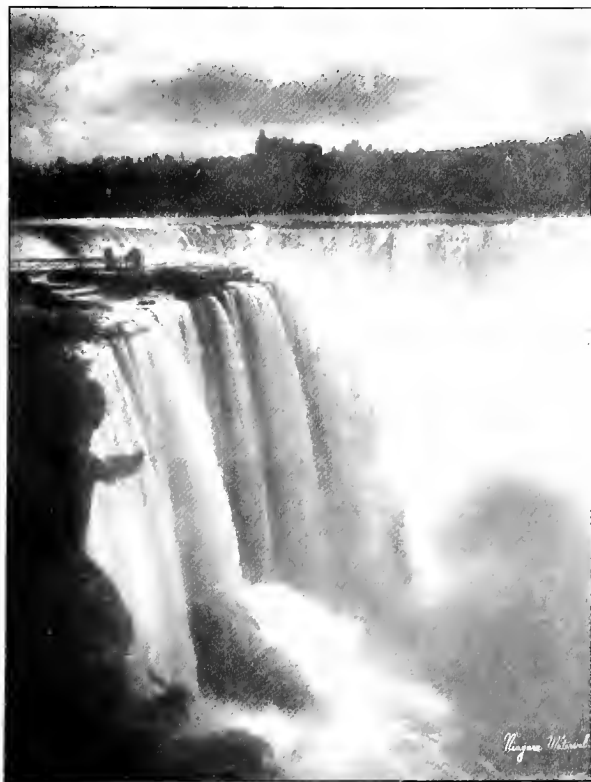
NIAGARA FALLS:

[Photo, *Topical Press*, London.]

river dashes over the precipice the Zambesi is 2,000 yards wide, while Niagara is less than 1,000 at the famous Falls. The drop of the Victoria Falls is 420 feet as against Niagara's 162. The discharge of the Zambesi is from 60 to 100 gallons per minute against 222,000 (mean) or 176,000 (low-water) cubic feet per second of the Niagara. If we reduce these to a common denominator we have the following interesting comparisons in volume. At high water, the Zambesi discharges 100,000,000 gallons per minute against Niagara's 83,000,000 gallons, mean. At low water the volume of water passing over Victoria Falls is 60,000,000 gallons, while at Niagara 66,100,000 gallons flow in the same interval.



If we express this in tons of 2,000 pounds we find that the Zambesi, at high water, discharges 30,000,000 tons per hour against Niagara's 24,975,000. At low water the figures are, Niagara 19,830,000, and the Zambesi 18,000,000 tons. If we accept as mean at Victoria Falls low water plus one half of the difference between the extremes it appears that the discharge of Niagara is slightly in excess of that



*[Photo, Topical Press, London.]*

#### NIAGARA FALLS.

of the Zambesi at the Falls, the mean figures being Victoria Falls 24,000,000 tons per hour, and Niagara 24,975,000.

If we judge by the number of visitors who find their way to these two great centres of attraction, we must concede the premier position to the Niagara Falls. It is estimated that from 800,000 to 1,200,000 visitors wend their way to Niagara Falls every year, while only some 2,000 visit the Victoria Falls in that



time. But remembering the meagre population of South Africa and the enormous distances from the populous centres to Victoria Falls, we have indisputable evidence that Victoria Falls have a unique attraction for travellers and stand near the top of the list of Nature's beauty spots which all lovers of the beautiful desire to see.

The following table of figures relative to the various waterfalls mentioned in these notes may be found useful :—

Howick Falls, Natal	.....Drop, 360 feet.
Malutsenyane Falls, Basuto-	
land	.....Drop, estimated at 700 feet.
N'gonya Falls, Barotseland..	Drop, 55 feet. Width of stream, about 1,300 yards.
Niagara Falls	.....Drop, 162 feet. Width, 860 yards.
	Discharge per minute :
	Mean, 83,250,000 gals.
	Low Water, 66,100,000 gals.
	Tons per hour :
	Mean, 24,975,000.
	Low Water, 19,830,000.
Victoria Falls	.....Drop, 420 feet. Width, 2,000 yds.
	Discharge per minute :
	High Water, 100,000,000 gals.
	Mean, 80,000,000 gals.
	Low Water, 60,000,000 gals.
	Tons per hour :
	High Water, 30,000,000.
	Mean, 24,000,000.
	Low Water, 18,000,000.





# NOTES ON SOME OF THE COMMONER FERNS AT THE VICTORIA FALLS

JOHN MUIR, M.D.

THE list of ferns given below is not intended to be exhaustive, but merely to afford some idea to the casual observer of what is likely to be met with on an ordinary visit.

Up to 1906 the total number of ferns known in South Africa, including the fern allies, was 212. These were distributed as follows :—

Cape Province and Kaffraria .....	138
Orange Free State Province .....	19
Transvaal .....	90
Natal .....	147
Rhodesia and Zambesia .....	105

Of the ferns found in Rhodesia and Zambesia twenty-six were peculiar thereto, and unrecorded from other parts of South Africa ; and in time when the country has been more carefully investigated the number will probably be considerably increased.

Most of the ferns which a visitor is likely to see at the Falls are not really rare, and are found in great abundance in other parts of South Africa. The same applies to much of the vegetation. The tiny crimson bean (*Abrus precatorius*. L.) so eagerly bought up, a creeper belonging to the pea family, is common in parts of Natal and the Transvaal. The " sausage tree " (*Kigelia pinnata* D. C.) grows in the Eastern Transvaal as well as at the Falls. The " water-boom " which forms the green rampart of trees facing the Falls in the main forest (*Syzygium cordatum*. Hochst.) is widely distributed in South Africa in similar situations. When the traveller realizes this, and does not allow the glamour of the magnificent scenery around to lead him to think that every fern and flower must be of the utmost rarity, he will be less likely to devastate the Rain Forest and the Palm Grove. He will save himself much disappointment, as ferns taken from the Falls most usually die. It is within the power of few of us to imitate by fern grottos and conservatories the natural conditions of climate and soil obtaining at the spot from which they were taken.



The main, leaf-like, above-ground portions of a fern are known as *fronds*. When the fronds are cut down to the central stalk on each side they are said to be *pinnate*, and the divisions are *pinnæ*. If these pinnæ are again so divided, it is said to be *twice-pinnate* and the divisions are *pinnules*. Some ferns are twice, thrice or more pinnate. If the cutting does not go right down to the central stem, they are *pinnatifid* or partly cut, instead of pinnate.

The *sori* are small bundles of spores usually on the under surface of the frond, from which young plants are produced, and vary in shape and position.

(1) *Adiantum caudatum*. L. Belongs to the Maidenhair group. Frond once-pinnate, 1 inch broad, 12 to 18 ins. long. More or less hairy. Sori at edge of pinnæ. Grows in many places in Rhodesia, also in Natal. Distinguish from (2) and (7).

(2) *Adiantum lunulatum*. Burm. Resembles preceding but the little pinnæ are two to three times as large, and the whole plant is hairless. Sori at edge of pinnæ. Many localities in Rhodesia. Distinguish from (1) and (7).

(3) *Adiantum Capillus Veneris*. L. The well known "Maidenhair." Fronds twice or thrice pinnate. Abundant in Rain Forest, and in no way different from that found in nearly every part of South Africa. Nothing can be gained by taking it away. Sori at edge of pinnules.

(4) *Cheilanthes farinosa*, Kaulf. A small, much divided fern, averaging 6 ins. in length and 4 ins. in breadth. Sori along the edge. Frond smooth above, but coated below with a yellowish-white, mealy powder. Found in Rhodesia only.

(5) *Pteris quadriaurita*, Retz. One of the largest ferns found at the Falls. Up to 4 feet long, and 1 to 2 feet broad. Sori in lines along the edge of the pinnules. Found near water or in bush in Palm Grove, Rain Forest, etc. Also throughout the tropics, Rhodesia, frequent in Natal, and in Kaffraria.

(6) *Pteris aquilina*, L. Sori in lines along the edge of the pinnules. The ordinary "bracken." As common in many parts of Rhodesia as in Britain, and in no way different. Found in every state in South Africa. Too well known to require description.

(7) *Asplenium erectum*, Bory. var. *lunulatum*. Frond 2 to 3 feet long, 2 to 3 inches broad, once pinnate. Sori in little oblong lines (not round), set obliquely between the edge and mid-rib of the pinnæ (not along the edge). Common in Cape Province, and found in every State except O. F. S. Distinguish from (1) and (2) by position of sori.



(8) *Nephrodium Bergianum*, Bkr. Of fourteen species of *Nephrodium* found in Rhodesia and Zambesia, only three concern us here. This is again a very large fern, up to 5 feet long,  $\frac{1}{2}$  to  $1\frac{1}{2}$  feet broad. Sori small, round (not line-shaped), placed in rows half-way between the middle, and the margin of the pinnules on each side of midvein. Pinnules are cut *almost* but not quite to the midrib of the pinnæ, and when frond is held up to the light, it is noted that the veins of one pinnule do not run round at the bottom to join those of neighbouring pinnules. Common in all parts of Cape Province and Natal; also found in Transvaal and other parts of Rhodesia. Distinguish from (9) and (10).

(9) *Nephrodium mauritianum*, Fée. This fern resembles the preceding closely. The pinnules, however, are not cut down so far, and are thus connected below sufficiently to allow the veins of adjoining pinnules to run round and join each other. In size and general shape they are alike. Other botanical distinctions cannot be entered into here. Sori as in (8). Much less common than (8) but found in Kaffraria, Natal, and other parts of Rhodesia. Distinguish from (8) and (10).

(10) *Nephrodium unitum*, R. Br. A smaller fern  $1\frac{1}{2}$  to 2 feet long, 6 ins. broad. Sori as in two preceding ferns. Pinnæ only slightly cut, for one twelfth to one sixth inch, so that there is a broad connection between adjoining pinnules, and the veins join each other. The frond is as broad below as in the middle, whereas in (8) and (9) it is narrower below than in the middle. Found in various parts of Cape Province, Natal and Zambesia.

(N.B. *Nephrodium molle*, Desv. which grows in Kaffraria, Natal, Transvaal, Rhodesia and Zambesia, and is closely allied to the three preceding ferns is on the price lists of most S. African florists.)

(11) *Nephrolepis cordifolia*, Presl. Frond 1 to 4 feet long, about 2 ins. wide, once pinnate. The base of each pinna where it joins the stem, is heart-shaped. Sori round, half way between the edge and the midrib. The pinnæ are undivided. Found in Rhodesia. Ferns closely approaching this are sold by S. African florists.

(12) *Mohria caffrorum*, Desv. A finely divided fern 3 to 18 ins. long, 1 to 3 ins. broad. Fragrant when crushed in the hand; the well known "scented fern." Not mealy below. Found in every State in S. Africa.

(13) *Psilotum triquetrum*, Sw. This is really a fern-ally and not a true fern. It is a remarkable grass-like plant, almost leafless, growing in tufts on trees around the Falls. Stems three-angled. Found in Natal and in the tropics. To be distinguished from




*Vittaria lineata*, Sw., a grass-like fern, also growing on trees, with sori extending along each edge in a long, continuous line. Found in Cape Province, Kaffraria, Natal, and reported from Zambesiland, but not actually from the Falls although most probably to be found there. The broader leaved plants growing in the forks of trees are orchids, and not ferns.

To those who are interested in ferns, whether of Rhodesia, or of South Africa in general, may be recommended the study of the work of T. R. Sim, "The Ferns of South Africa," with 159 plates, 1892, published by Juta and Company; "Recent Information Concerning S. A. Ferns and their Distribution," in trans. of the S. A. Philosophical Society, Vol. XVI., Part 3, 1906.

The first mentioned magnificent work is unfortunately out of print, and difficult to procure.








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